

Remarks

In this discussion set forth below, Applicant does not acquiesce to any rejection or averment in this Office Action unless Applicant expressly indicates otherwise.

The Office Action dated September 12, 2008, indicated that claims 1-7, 9-12, 14-20 and 39-43 stand rejected under 35 U.S.C. § 103(a) over Sin *et al.* (US 5,869,847); claims 8 and 13 stand rejected under 35 U.S.C. § 103(a) over Sin as applied to claim 1, and further in view of Baba (US 5,589,696); and claims 21-38 stand rejected under 35 U.S.C. § 103(a) over Koga *et al.* (US 5,936,265).

Applicant respectfully traverses each of the rejections by the Examiner for failing to show correspondence to each claim limitation. The Sin and the Koga references are structurally and functionally distinct from the claimed invention. Each rejection relies upon the incorrect conclusion that, relative to the claimed invention, the “prior art products are identical or substantially identical in structure or composition or are produced by identical or substantially identical processes”. Thus, if this statement does not hold, each of the rejections is improper.

Applicant submits that each of the Sin and Koga references has important structural and functional differences from the claimed invention. For instance, Sin is directed toward gate devices in which the intermediate region functions as a current channel between source and drain (*see, e.g.*, Sin at Summary of the Invention). Moreover, Sin teaches that the source is segmented to include doping of the same type as the drain (*see* Sin; FIG. 1(b) and column 3, lines 13-19; teaching the same (*e.g.*, P+) doping in both the drain and the source). Accordingly, the gate devices of Sin are not designed to operate in a reverse bias condition. This is further evidenced by Sin’s teaching that the P+ and N+ portions are interchangeable (*see, e.g.*, Sin at Col. 3, lines 8-12). If reverse bias conditions were present during operation of the device, the P+ and N+ portions could not simply be interchanged. Koga is similarly directed toward a channel region between source and drain (*see, e.g.*, Koga at col. 15, line 22 to col. 16 line 23). While Koga teaches the creation of tunnel diodes, these tunnel diodes are formed between the drain and an inversion layer formed in the silicon substrate. Moreover, tunnel diodes have different operating characteristics from typical PN-type junctions. Tunnel diodes are generally used for their unique property of negative resistance due to quantum mechanical tunneling effects (*see, e.g.*, Koga FIG. 1). Tunnel diodes, however, allow significant current flow (*i.e.*, relative to leakage current)

when reverse voltages are applied. Thus, the device of Koga reference is different in structure and function relative to Applicant's claimed invention.

Applicant's claims include limitations directed toward various implementations where the device exhibits a reverse-bias condition. The skilled artisan would interpret reverse bias as representing bias on a (PN-type) junction that only allows leakage current (small current of minority carriers) to flow, up until breakdown. Embodiments of Applicant's invention are specifically directed to a PIN-type device with oppositely doped P+ and N+ regions that are sufficiently large relative to the intermediate region to define the metallurgic junctions (*see, e.g.*, page 7, lines 26-30 and page 9, lines 10-18 of the original version of the application). Interpretation of claim terms is to be consistent first with Applicant's specification and second with the plain meaning of the term. Applicant's specification is consistent with the plain meaning of the term reverse-bias. The specification teaches that little current flows under reverse bias conditions up until the breakdown voltage is exceeded. The devices and Sin and Koga, however, function as transistors for which a conduction channel is generated between drain and source, thereby effectively reducing the effective length of the intermediate region to zero. Thus, the term reverse bias cannot be interpreted to read on the devices of Sin and Koga.

These aspects are not present (nor desirable) in the references of Sin and Koga. Reverse bias conditions in the cited devices of these references would significantly change the functionality of the devices, thereby leading to unpredictable results and a frustration of the purpose of the devices. Accordingly, the relied upon portions of Sin and Koga do not operate in reverse bias, due to differences in structure relative to Applicant's claimed invention. Applicant requests that each rejection be withdrawn for failing to show correspondence to each claim limitation.

Applicant further submits that many of the assumptions made by the Office Action regarding other limitations, such as those in dependent form, are unsupported by the teachings of the record. This is, in part, due to the mistaken assumption that the structures of the Sin and Koga reference are substantially identical to the claimed invention (and therefore function in the same manner). Accordingly, each of these limitations has not been addressed.

The above-noted claim amendments are stylistic and intended neither to change the scope of the claims nor overcome any rejection.

In view of the above discussion, Applicant believes that each of the rejections is overcome, and that the application is in condition for allowance. A favorable response is requested. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is encouraged to contact the undersigned at (651) 686-6633.

Respectfully submitted,

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